NEDIKTOV, IVAN ALEKSANDROVICH

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.B4

Sovkhozy v shestoy pyatiletke (Sovkhozes in the 6th Five-yeat Plan) Moskva, "Znaniye", 1956.

31 p. tables (Vsesoyuznoye Obshchestvo po Rasprostraneniyu Politicheskikh i Nauchnykh Znaniy, ser. 5, No. 32)

722.102 N/5
783.33 N/5

AVS

BENEDIKTOV, Ivan Aleksandrovich; BERGAUZ, R.I., red.; BALLOD, A.I., tekhn.red.; GOR'KOVA, Z.D., tekhn.red.

[State farms of our land] Sovkhozy nashei strany. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1957. 78 p. (MIRA 11:1)
(State farms)

BENEDIKTOV, Ivan Aleksandrovich.

[Ways of lowering production costs on state farms] Puti snizheniia sebestoimosti produktsii sovkhozov. Moskva, Gospolitizdat, 1957. 83 p. (MIRA 11:1)

(State farms--Costs)

BENEDIKTOV, Ivan Aleksandrovich

[Possibilities for reducing the cost of produce on state farms] Rezervy udeshevleniia proizvodstva produktsii v sovkhozakh. Moskva, Gosplanizdat, 1958. 199 p. (MIRA 12:10)
(Farm produce) (State farms)

BENDIKTOV, I.

Rise in production and reduction in the price of grain, milk, and meat is a most important task for state farms. Vop. ekon. no.1: 29-46 Ja '58. (MIRA 11:3)

1. Ministr sel'skogo khozyaystva RSFSR.
(State farms)

BENEDIKTOV, I.A.

Further ways to reduce production costs in raising poultry and sheep on state farms. Zhivotnovodstvo 20 no.8:3-11 Ag '58. (MIRA 11:10)

1. Ministr sel'skogo khozyaystva RSFSR.
(Stock and stockbreeding--Costs)

BENEDIKTOV, Ivan Aleksandrovich; VISHNYAKOVA, Ye.A., red.; KUZNETSOVA, G.I., tekhn.red.

[Agriculture of the Russian Federation in the seven-year plan] Sel'skoe khoziaistvo Rossiiskoi Federatsii v semiletke. Moskva, Izd-vo "Sovetskaia Rossiia," 1959. 94 p. (MIRA 13:1)
(Agriculture)

BENEDIKTOV, I.I., kandidat meditsinskikh nauk.

Certain observations of the effect of mammin. Akush.i gin. no.1:21-26 Ja-F '54. (MLRA 7:6)

1. Iz kafedry akusherstva i genekologii (zaveduyushchiy - professor B.S.Poyzner) Tomskogo meditsinskogo instituta im. V.M.Molotova.
(Labor) (Hormones)

BENEDIKTOV, I.I.

[Psychoprophylaxis for childbirth] Psikhoprofilaktika boley v rodakh. Moskva, Medgiz, 1955. 28 p. (MLRA 10:3)
(CHILDBIRTH--PSYCHOLOGY)

BENEDIKTOV, I.I.

Effect of remote irritations on the bioelectrical activity of the uterus. Akush. i gig. 33 no.2:14-17 Mr-Ap '56. (MLRA 9:7)

1. Iz kafedry akusherstva i ginekologii (zav.-prof. B.S.Poyzner) Tomskogo meditsinskogo instituta imeni V.M.Molotova
(UTERUS, physiol.
eff. of light & nois on bioelectric activity in exper.)
(LIGHT, eff.
on bioelectric activity of uterus, exper.)
(NOISE, eff.
same)

BENEDIKTOV, I.I.

Apparatus for measuring circulation rate and temperature of the internal organs. Fiziol.zhur. 43 no.10:995-997 O '57. (MIRA 11:1)

1. Laboratoriya normal'noy i patologicheskoy fiziologii Instituta akusherstva i ginekologii AMN SSSR i Kafedra akusherstva i ginekologii Tomskogo meditsinskogo instituta.
(BLOOD CIRCULATION, determination, same)

BENEDIKTOV, I. I. Doc Med Sci -- (diss) " On blood circulation and temperature in the uterus in certain physiological and pathological states of the organism (Clinical experimental study)." Tomsk, 1959. 30 pp (Tomsk Med Inst. Inst of Obstetrics and Gynecology, Acad Med Sci USSR), 200 copies (KL, 44-59, 128)

BENEDIKTOV, Ivan Ivanovich

[New method for the simultaneous measurement of the intensity of blood flow and temperature and its use under experimental conditions and in clinical practice] Novyi metod odnovremennogo izmereniia intensivnosti krovotoka i temperatury i ego ispol'zovanie v eksperimente i klinike. Tomsk, Izd-vo Tomskogo univ., 1959. 30 p. (MIRA 13:12)

(BLOOD--CIRCULATION) (BODY TEMPERATURE)

BENEDIKTOV, I.I. (Tomsk)

Blood circulation in the uterus following drug therapy of fibromyomas. Kaz. med. zhur. no. 2:109-110 Mr-Ap '61.
(MIRA 14:4)

(UTERUS—TUMORS) (UTERUS—BLOOD SUPPLY)

BENEDIKTOV, L.I.

Vascular reaction and temperature in the uterus following inhalation of oxygen, carbogen, and ether. Ped., akush. i gin. 23 no.1:45-47 '61. (MIRA 14:6)

1. Kafedra akusherstva i ginekologii (zaveduyushchiy - prof. B.S.Poyzner) Tomskogo meditsinskogo instituta i laboratoriya normal'noy i patologicheskoy fiziologii (zav. - prof. N.L. Garmasheva [Harmasheva, N.L.] Instituta akusherstva i ginekologii AMN SSSR.

(UTERUS) (OXYGEN—PHYSIOLOGICAL EFFECT)
(CARBON DIOXIDE—PHYSIOLOGICAL EFFECT)
(ETHER—PHYSIOLOGICAL EFFECT)

BENEDIKTOV, I.I.

Effect of pituitrin, mammophysin, and adrenaline on the uterine circulation. Farm.i toks. 24 no.1:94-99 Ja-F '61. (MIRA 14:5)

1. Kafedra akusherstva i ginekologii (zav. - prof. B.S.Poyzner) Tomskogo meditsinskogo instituta i patofiziologicheskoy laboratorii (zav. - prof. N.L.Garmasheva) Instituta akusherstva i ginekologii AMN SSSR.

(PITUITARY HORMONES) (ADRENALINE)
(UTERUS—BLOOD SUPPLY)

BENEDIKTOV, I.I.; GOL'DBERG, D.I., prof., red.; OSOVSKIY, A.T., tekhn. red.

[Blood circulation and temperature of the uterus in some physiological and pathological states of the organism]O krovoobrashchenii i temperature v matke pri nekotorykh fiziologicheskikh i patologicheskikh sostoianiiakh organizma. Toms, Izd-vo Tomskogo univ., 1960. 123 p. (MIRA 16:2)
(UTERUS--BLOOD SUPPLY) (BODY TEMPERATURE)

BENEDIKTOV, ~~I. I.~~

Uterine circulation and temperature in fibromyomas. Akush. i gin. no.2:73-76 '62. (MIRA 15:6)

1. Iz kafedry akusherstva i ginekologii (zav. - prof. B. S. Poyzner) Tomskogo meditsinskogo instituta i laboratorii normal'noy i patologicheskoy fiziologii (zav. - prof. N. L. Garmasheva) Instituta akusherstva i ginekologii AMN SSSR.

(UTERUS--TUMORS) (UTERUS--BLOOD SUPPLY)
(BODY TEMPERATURE)

BEHLEIZTOV, [illegible]

Proteins in the cavitary fluid of [illegible] sum Goeze, 1758) kept in a protein-free med[illegible] i paraz. bol. 31 no.6:660-664 N-D '62.

[illegible]

1. Iz otdela gel'mintologii (zav. - prof. V.P. Pod"ya[illegible] instituta meditsinskoy parazitologii i tropicheskoy [illegible] imeni Ye.I. Martsinovskogo (dir. - prof. P.G. [illegible] sterstva zdravookhraneniya SSSR.

[illegible]LEYTMAN, Ye.[illegible]; BENEDIKTOV, [illegible]

Observations of the effect of polyvalent bacterial preparations on the temperature of some internal organs in rabbits. Trudy TomNIIVS 14.161-16[illegible] [illegible]

[illegible] Tomskiy nauchno-issledovatel'skiy institut vaktsin i syvorotok i Tomskiy meditsinskiy institut.

BENEDIKTOV, I.I.

Electrothermometer for prolonged and continuous measurement of the temperature of internal organs. Trudy TomNIIVS 14: 281-284 '63. (MIRA 17:7)

1. Iz kafedry akusherstva i ginekologii Tomskogo meditsinskogo instituta.

BENEDIKTOV, I.I.; GALEYEVA, L.S.

Hypotension as a symptom of pregnancy toxemia. Akush. i gin. 40 no.1:75-80 Ja-F '64. (MIRA 17:8)

1. Kafedra akusherstva i ginekologii (zav. - doktor med. nauk I.I. Benediktov) Sverdlovskogo meditsinskogo instituta i fiziologicheskaya laboratoriya Sverdlovskogo instituta okhrany materinstva i mladenchestva (dir. R.A. Malysheva).

[illegible], I.I.

[illegible] the [illegible] 17(8. Report No.1: [illegible] and study of [illegible] Zhur. [illegible] Vol. [illegible]

1. [illegible] P.S. Sergeyev) [illegible]

BENEDIKTOV, I.I.

Mitochondria of the muscle tissue of Ascaris suum Goeze, 1758. Report no.2: Effect of alcopar and some of its derivatives on the oxidation of the components of the Krebs cycle. Med. paraz. i paraz. bol. 33 no.6:681-685 N-D '64. (MIRA 18:6)

1. Otdel gel'mintologii Instituta meditsinskoy parazitologii i tropicheskoy meditsiny imeni Martsinovskogo Ministerstva zdravookhraneniya SSSR, Moskva.

BEN[illegible] [illegible]; SHEV[illegible]ENKO, A.M.

[illegible]teristics of the course of [illegible] pregnant women with hypertension. Akush. i gin. [illegible] (MIRA 18:6)

1. Kafedra akusherstva i ginekologii [illegible] I.I.Benediktov) [illegible]vskogo meditsinskogo instituta.

BENEDIKTOV, [illegible]; LAIMENKOVA, Ye.A.

Inhibition of the reactions of [illegible] and [illegible] of dicarboxylic acids of Krebs' cycle with beta-[illegible] acid. Med.paraz. i paraz.bol. 33 no.3:[illegible] My-Je '6[illegible].

(MIRA 18:2)

1. Otdel gel'mintologii Instituta meditsinskoy [illegible] i tropicheskoy meditsiny imeni Martsinovskogo [illegible] zdravookhraneniya SSSR, Moskva.

[illegible], L. A.

Benediktov, L. A. and [illegible], [illegible] - "On reflex contractures and [illegible]," In symposium: [illegible] Neyrokhirurg. Soveta i Leningr. [illegible] neyrokhirurgii, (Akad. med. nauk SSSR), Moscow, 1948, p. [illegible]

SO: [illegible], [illegible], (Letopis 'Zhurnal 'nykh Statey, [illegible]

B[illegible], [illegible]. A.

L[illegible], L. [illegible]. a[illegible] [illegible], [illegible]. A. - "[illegible]
[illegible] [illegible] electro[illegible] [illegible]", [illegible]
[illegible]. [illegible]. In-ta, Vol. VI, [illegible], [illegible]. 2[illegible] - [illegible].

SO: [illegible]-[illegible]1, [illegible] S[illegible]t. 5[illegible], (L[illegible] [illegible] [illegible], [illegible]).

SMELOV, S., BENEDIKTOV, P.

Agricultural Research

Scientific institutes help production on collective farms. Kolkh, proizv. 12 No. 2, 1952.

9. Monthly List of Russian Accessions, Library of Congress, June 1952, Uncl.

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000200010009-9"

BENEDIKTOV, P.P.

Design new system units for over-all automation. Priborostroenie no.9:24-26 S '61. (MIRA 14:9)

1. Direktor zavoda "Tizpribor".
(Automation) (Instruments)

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000200010009-9"

BENEDIKTOV, V. (Novosibirsk)

Lint removal from instrument dials. Radio no.4:47 Ap '54. (MLRA 7:4)
(Radio--Receivers and reception)

SOV/33-35-4-6/25

3(1)

AUTHOR: Benediktov, Ye.A.

TITLE: On the Question Concerning the Frequency of the Radio Line of the CH- Molecules (K voprosu o chastote radiolinii molekul CH)

PERIODICAL: Astronomicheskiy zhurnal, 1958, Vol 35, Nr 4, pp 656-657 (USSR)

ABSTRACT: According to Shklovskiy /Ref 1,2/ the CH-molecules existing in the interstellar space possess a monochromatic radio radiation, the wave length of which amounts to about 9.5 cm. The author tries to obtain the more exact frequency value of this radiation which would essentially facilitate the observation of the little intensive line. He carries out an exact investigation of the existing material of observation, however, he comes to a nonsatisfactory result: The frequency shows a great dispersion.
There are 9 references, 5 of which are Soviet, 2 German, and 2 American.

SUBMITTED: December 20, 1957

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SOV/141-2-3-3/26

9.9100

AUTHORS: Benediktov, Ye.A., and Mityakov, N.A.

TITLE: On the Scattering of Radio Waves in the Ionosphere

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1959, Vol 2, Nr 3, pp 344 - 354 (USSR)

ABSTRACT: The case of a plane layered medium with irregularities in the dielectric constant is considered. A general solution is obtained for a plane wave at normal incidence, and an approximate solution (for small angles) for oblique incidence. An approximate solution is also obtained for the normal incidence of a spherical wave. The results are used to estimate fluctuations in the electron density in the ionosphere. It is shown that the ratio of the scattered to the incident energy for plane waves is given by Eq (5), where the function f(z) is given by Eq (4), σ is the effective scattering cross-section, θ_2 is the angle of scattering and φ is the azimuthal angle. Al'pert (Ref 1) has shown that the effective scattering cross-section for a medium with a

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SOV/141-2-3-2/26

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dielectric constant ε is given by Eq (7). In the case of normal incidence the function $f(z)$ is then given by Eq (8) in which $a = 2\pi\xi/\lambda_o$, λ_o is the wavelength in vacuum, ξ is a typical linear dimension of the irregularities and $\overline{\Delta\varepsilon}$ is the mean value of the deviations from $\bar{\varepsilon}$, the mean dielectric constant. When Eq (8) is substituted into Eq (5), the ratio of scattered to incident energies in the case of normal incidence of plane waves is given by Eq (9). In the case of oblique incidence, the function $f(z)$ is given by Eq (13) and the ratio of scattered to incident energies is given by Eq (17). A similar calculation is carried out for spherical waves and the corresponding result for small scattering angles is given by Eq (24). These results are used to estimate fluctuations in the electron density in the ionosphere $(\Delta N/N)^2$. It is shown that if the latter quantity and ξ vary slowly with altitude, then Eq (24) may be replaced by Eq (27). The last two equations hold under the following conditions: 4

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1) scattering angles are small;
2) geometrical optics approximation applies;
3) fluctuations in the dielectric constant are small;
4) the point of observation is at a sufficiently large distance from the scattering volume and
5) the scattered energy is small compared with the incident energy.

Acknowledgments are made to V.L. Ginzburg and G.G. Getmantsev for their interest in this work and a number of valuable suggestions.

There are 1 figure and 6 references, 5 of which are Soviet and 1 English.

ASSOCIATION: Issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Radiophysics Research Institute of Gor'kiy University)

SUBMITTED: March 9, 1959

Card 3/3

AUTHOR: Benediktov, Ye.A. SOV/109-4-7-17/25

TITLE: Radio-astronomical Method of Determining the Absorption of Radio Waves in the Ionosphere

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 7, pp 1201 - 1202 (USSR)

ABSTRACT: The existing methods of measuring the absorption of the ionosphere are disadvantageous in that they require the determination of the actual intensity of the cosmic radiation. In the following, it is shown that it is possible to devise a method free of the above deficiency. This is based on the difference in the absorption of the ordinary and the extraordinary waves in the ionosphere when the magnetic field of the Earth is taken into account. If the intensity of the radiowave impinging onto the ionosphere is $2I_o$; the intensity at the exit of the ionosphere for the normal waves is given by:

$$I_i = I_o \exp\left(- 2 \frac{\omega}{c} \int \varkappa_i dl_i \right) \qquad (1)$$

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where $\varkappa_i$ is the absorption coefficient, ω is the angular frequency and c is the velocity of light. Therefore, if intensities I_1 and I_2 are recorded at a point on the Earth surface, their relationship can be expressed by Eq (2), which is independent of the initial intensity I_o. Eq (2) can be expanded and it is then approximately expressed by Eq (3). In the final form, it can be written as:

$$\frac{I_2 - I_1}{I_2 + I_1} = \frac{2}{c} \int \nu_{\text{эф}} \nu \omega_H \cos \alpha \, dl \qquad (6)$$

since the expressions for $\varkappa_i$ are in the form of Eqs (5). The symbols in Eq (6) are as follows: ω_H is the gyromagnetic angular frequency; α is the angle between the propagation direction of the waves and the magnetic field, $\nu_{эф}$ is the effective number of collisions and v is the ratio of the squares of plasma frequency and the operating frequency. When ω_H and $\cos \alpha$ are constant, Eq (6) can be simplified and written as Eq (7). Eqs (6) and (7) give the relationship between the experimentally measured parameters and the product $\nu_{эф} \cdot v$. The method of determining the absorption coefficients is equivalent to the standard methods and appears to be particularly suitable for the measurements in the polar regions, where the absorption is much greater than in the moderate latitudes. The author makes acknowledgment to G.G. Getmantsev for reading the manuscript and to V.L. Ginzburg for his interest in this work.

Card ~~3/4~~ 3/3 There are 6 references, of which 3 are English, 1 French and 2 Soviet.

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S/141/60/003/01/002/020
E032/E414

AUTHOR: Benediktov, Ye.A.

TITLE: On the Passage of Radio Waves Through the Ionosphere

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol 3, Nr 1, pp 33-38 (USSR)

ABSTRACT: The propagation of extra-terrestial radio emission through the ionosphere is discussed. It is well known that the ionosphere has an appreciable effect on radio waves, beginning with frequencies of the order of 50 to 30 Mc/s or less. The frequency region 30 Mc/s to 30 kc/s can be conveniently divided into two parts, namely $f > f_{HO}$ and $f < f_{HO}$ where f_{HO} is the gyromagnetic frequency at the earth's surface. An expression is derived for the angular interval within which radio waves can be transmitted through the ionosphere for $f > f_{HO}$. Both normal and oblique incidence are considered. In the case of frequencies $f < f_{HO}$ it is pointed out that the change in the magnetic field with altitude is usually neglected. However, at lower frequencies, the effect of the magnetic field variation becomes more important and

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it is essential to take it into account. The variation of the refractive index with altitude is assumed to be of the form given by the relation at the top of p 35, where the + and - signs refer to the ordinary and the extraordinary components. In order to use this formula in calculations it is necessary to assume a model for the ionosphere. The model is taken in the form of an exponential distribution above the maximum in the F_2 layer and parabolic below this maximum (half-thickness of 200 km). Fig 1 and 2 show the results of calculations of the refractive index as a function of altitude for a frequency of 0.6 Mc/s (full curve: ordinary component). These calculations refer to normal incidence, the angle between the magnetic field and the vertical being 20°. The variation of the magnetic field with altitude was taken to be of the form $H = H_0 [R/(R+z)]^3$ where H_0 is the magnitude of the magnetic field at the earth's surface. Fig 1 also shows

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the corresponding curves for 0.4 Mc/s. In Fig 1, the full line (ordinary component) and the dashed line extraordinary component) refer to 0.6 Mc/s while the dot-dash curve (ordinary component) and the dotted curve (extraordinary component) refer to 0.4 Mc/s. In Fig 2, the full line corresponds to the ordinary component and the dashed line to the extraordinary component. The latter two curves are given for $f = 0.6$ Mc/s, the incidence being normal and the angle between the magnetic field and the vertical equal to zero. These curves show that the extraordinary component cannot reach the earth's surface even if the concentration v is very small. This is characteristic of the frequency region $f < f_{HO}$. It is clear from these curves that when the angle between the magnetic field and the vertical field is not zero, the refractive index for the ordinary component vanishes at $v = 1$. If $f = 0.6$ Mc/s, the ordinary component will reach low-lying layers of the ionosphere. The experiments of Reber (Ref 4) can be interpreted in terms

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of these calculations. A definite agreement with Reber's results is not obtained. Acknowledgement is made to V.L.Ginzburg and G.G.Getmantsev for their interest and advice. There are 2 figures and 8 references, 6 of which are Soviet and 2 English.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radio-Physical Institute of the Gor'kiy University)

SUBMITTED: July 23, 1959

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S/141/60/003/02/019/025
E041/E321

AUTHORS: Benediktov, Ye.A. and Korobkov, Yu.S.

TITLE: Absorption of Cosmic Radio Emission During the Magnetic Storm of July 15, 1959

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika. 1960, Vol 3, Nr 2, pp 333 - 334 (USSR)

ABSTRACT: Observations were made at Latitude 56°09', Longitude 44°17' (near Gor'kiy) at frequencies of 18.6 Mc/s and 25 Mc/s, using a receiver with 3 kc/s bandwidth and an aerial, directed to the zenith, with a diagram measuring 26° x 36° to the half-power points. The receiver output circuit had a noise limiter similar to that described by Lee (Ref 1). Figure 1 shows the variation of the attenuation of incoming radiation at the two frequencies (—— 18.6 Mc/s), (.... 25 Mc/s) with time. Two large chromosphere flares had been observed on the sun on July 14. The delay between the optical and radio effects was 35 hours. During the night of July 15-16 a polar aurora was observed from Moscow. Figure 2 shows the variation with ~~of~~ time the ratio of the attenuations at each frequency. The straight horizontal lines correspond to variation of attenuation with frequency

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E041/E321

Absorption of Cosmic Radio Emission During the Magnetic Storm of July 15, 1959

on a square-law, linear and constant basis, respectively. It is concluded that the effect is taking place where the effect of collision frequency is approximately 10^8/sec, i.e. in the lower part of the D layer. There are 2 figures and 2 references, 1 of which is Soviet and 1 English.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific-research Radiophysics Institute of Gor'kiy University)

SUBMITTED: December 11, 1959

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S/141/60/003/005/001/026
E032/E314

AUTHORS: Benediktov, Ye.A. and Mityakov, N.A.

TITLE: Determination of the Relative Fluctuations of the Electron Concentration in the Ionosphere

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol. 3, No. 5, pp. 733 - 736

TEXT: One of the main parameters of ionospheric irregularities is the relative dispersion of the electron concentration $\delta N = \sqrt{\overline{(\Delta N/N)^2}}$. Al'pert (Ref. 1) has suggested a method for determining this quantity from experimentally determined fluctuations in a signal reflected from the ionosphere. Proshkin and Kaschev (Ref. 2) have reported determinations of δN using this method. However, these workers neglected the refraction of radio waves which, as was pointed out by the present authors in Ref. 3, is an important defect of this work. The present authors have also pointed out in Ref. 3 that it is possible to determine δN using observations of discrete sources of radio emission. It is of considerable interest to carry out simultaneous determination of δN both by pulsed

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and radioastronomical methods. The present paper reports results of such a determination which was carried out at the Scientific Research Radiophysical Institute at Gor'kiy University in the Autumn of 1959. If it is assumed that the irregularities in the electron concentration have mean linear dimensions ζ and are distributed uniformly throughout the ionospheric layer, then in the case of radioastronomical observations δN is given by:

$$\delta N = 0.34 \frac{\lambda_c^2}{\lambda_o \sqrt{\zeta \overline{z_m}}} \sqrt{\ln\left(\frac{P_s}{P} + 1\right)} \qquad (1)$$

while in the pulse method it can be estimated from the inequality given by Eq. (2), where λ_o and λ_c are the working and critical wavelength, respectively, and $\overline{z_m}$ is the effective

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thickness of the ionosphere, P_s/P is the ratio of scattered to transmitted signal energies and I is an integral depending on the parameters of the layer. The expression

$$\delta N \leqslant 0.17 \frac{\lambda_o}{\sqrt{\xi I}} \sqrt{\ln\left(\frac{P_s}{P} + 1\right)} \qquad (2)$$

holds for a signal which has been reflected only once. In the case of double reflection the inequality

$$\delta N \leqslant 0.17 \frac{\lambda_o}{\sqrt{\xi I}} \sqrt{\frac{1}{2} \ln\left(\frac{P_s}{P} + 1\right)} \qquad (3)$$

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E032/E314

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must be employed The above formulae were derived on the assumption that:

1) the relative fluctuations in the dielectric constant are small,
2) the angles of scattering ϑ are small ($\ll 1$),
3) the geometrical-optics approximation holds and
4) the point of observation is at a great distance from the scattering region.

It was also assumed that the dependence of the concentration on altitude is given by:

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$$N = \begin{cases} N_o\left[1 - \left(\dfrac{z - z_o}{z_m}\right)^2\right] & (z < z_o) \\ N_o \exp\left[-\alpha(z - z_o)\right] & (z > z_o) \end{cases} \qquad (4)$$

X

where z_o is the altitude of the maximum,

N_2 is the electron concentration at $z = z_o$.

Under these conditions the effective thickness of the ionosphere is given by:

$$\tilde{z}_m = z_m + 1/\alpha .$$

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S/141/60/003/005/001/026
E032/E314

Determination of the Relative Fluctuations of the Electron Concentration in the Ionosphere

In the calculations $\ddot{z}_m$ was assumed to be equal to 400 km. The dimensions of the irregularities ξ were estimated from the formula $\xi = VT$, where T is the mean period of fluctuations and V is the velocity of motion of the irregularities. In calculating ξ, it was assumed that these irregularities move with a mean velocity of 100 m/sec. The integral I was calculated in Ref. 3. It was found that the pulse method gives $\delta N < 4 \times 10^{-3}$ and $\delta N < 10^{-2}$ for the F and E layers, respectively. Fluctuations in the emission of discrete sources (Cassiopea A and Cygnus A) gave the value of $\delta N \sim 5 \times 10^{-3}$. Acknowledgments are expressed to V.L. Ginzburg and G.G. Getmantsev for their interest and valuable advice.

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86848

S/141/60/003/005/001/026
E032/E314

Determination of the Relative Fluctuations of the Electron Concentration in the Ionosphere

There are 5 references: 4 Soviet and 1 English.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysical Institute of Gor'kiy University)

SUBMITTED: June 6, 1960

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21166

S/141/60/003/006/005/025
E032/E114

9.9100 (also 1041, 1046)

AUTHORS: Benediktov, Ye.A., Korobkov, Yu.S. Mityakov, N.A., Rapoport, V.O., and Khodaleva, L.N.

TITLE: Results of Measurements of the Absorption of Radio Waves in the Ionosphere

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol.3, No.6, pp. 957-968

TEXT: Results obtained at Gor'kiy in 1959 are reported. The total absorption in the ionosphere was measured with the aid of the "method of two frequencies". The method is described as follows. Suppose that the cosmic radio emission is received simultaneously on two frequencies, f_1 and f_2 where $f_2 > f_1$. For each of these frequencies the integral absorption of radio waves in the ionosphere is given by:

$$\Gamma_i = \ln (I_{0i}/I_i), \tag{1}$$

where I_{0i} and I_i are the intensities of cosmic radio emission of frequency f_i before and after passage through the

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ionosphere. If $(2\pi f_1)^2 \gg \nu^2$ and $f_i^2 \gg f_c^2$, where ν is the effective number of collisions of electrons with ions and neutral molecules, and f_c is the critical frequency of the F-layer, then the integral absorption is given by:

$$\Gamma_i = \frac{e^2}{\pi m c f_i^2} \int_0^z N \nu \, dz \qquad (2)$$

In this expression N is the electron concentration, z is the thickness of the absorbing layer, e and m are the charge and mass of the electron, and c is the velocity of light. It then follows that $\Gamma_1/\Gamma_2 = (f_2/f_1)^2$ and hence, finally, the integral absorption for each of the frequencies is given by:

$$\Gamma_1 = \frac{\ln (I_{02}/I_{01}) - \ln (I_2/I_1)}{1 - f_1^2/f_2^2} \qquad (3a)$$

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Results of Measurements of the Absorption of Radio Waves in the Ionosphere

and

$$\Gamma_2 = \Gamma_1 (f_1/f_2)^2 \tag{3b}$$

If I_{02}/I_{01} does not depend on the galactic coordinates then changes in Γ_i with time depend only on the ratio of the two frequencies. In fact, the above intensity ratio is not independent of the galactic coordinates but this fact should not lead to large errors in the absorption measurements. Published data on the absorption of radio waves in the ionosphere during night hours shows that the absorption is frequently negligible. If the intensity ratio I_{02}/I_{01} is determined for these hours, then the absorption for any other time can be calculated from Eq. (3). It may be shown that the optimum frequency range for the above method differs from the standard method (described by Blum et al. in Ref.2 and Mitra and Shain in Ref.3) in that it does not require highly specialized apparatus or prolonged observations. The present authors have used the above method between August and

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Results of Measurements of the Absorption of Radio Waves in the Ionosphere

December 1959 on 8.6 and 25 Mc/s. The results obtained show that the absorption has a characteristic maximum at noon each day, and a minimum at about 4 hrs. In August and September there is also an additional evening maximum at about 20 hrs. The magnitude of the noon maximum was found to be 1.1 db in August, 1.15 db in September, 1.2 db in October and November, and 1.6 db in December (on 18.6 Mc/s throughout). Fig.4 shows the diurnal dependence of the total absorption (continuous curve) and the absorption in the lower layers of the ionosphere (dotted curve) averaged over the periods 23rd to 31st October (Fig.4a) and 12th to 15th November (Fig.4б). The results obtained by the Radio Astronomical methods were checked by means of the pulse method described by Pigott et al. (Ref.9). Fig.5 shows the dependence of the absorption in the F-layer on the critical frequencies of the F-layer (18.5 Mc/s) (curve I - 12th to 15th November; curve II - 20th to 31st October; curve III - data from Ref.5). Acknowledgements are expressed to G.G. Getmantsev and V.L. Ginzburg for interest and advice.

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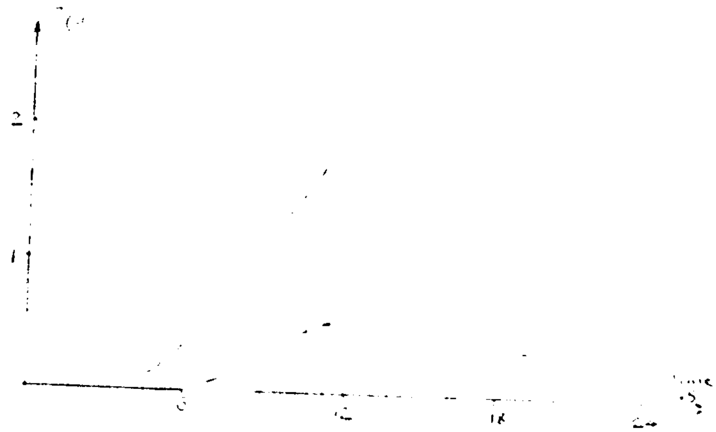
Results of Measurements.... S/141/60/003/006/005/025
E032/E114

There are 5 figures and 13 references: 5 Soviet and 8 non-Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of the Gor'kiy University)

SUBMITTED: May 10, 1960

Fig.4a



Card 5/7

3.2300 (1062,1080)
3.1700

2665?
S/560/61/000/007/00?/0??
E03?/E??

AUTHORS: ?e??ktov, Ye.A., Getmantsev, G.G. and Ginzburg, V.L.

TITLE: Radio-astronomical studies using ... satellites and space rockets

PERIODICAL: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli, No.7, Moscow, 1961, pp. 3-22

TEXT: In a previous paper (Ref.1: ... Ginzburg, I.S. Shklovskiy, UFN, 66, 1?7, 1958) ... applications of artificial Earth satell... discussed. The present paper extends ... particular attention to fundamental pr... discussions of specific forms of app... into the following sections: 1) ... 2) measurements of sporadic radio em... 3) cosmic radio emission and the ra... sources, 4) radio emission in the ra... the planets, 5) studies of the iono... medium. The first part of this paper ... λ < 1-3 cm. The high-frequency radio ...

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moon can be investigated with the aid [illegible] while the observation of this emission [illegible] millimeter wavelengths is of great [illegible] strongly absorbed in the troposphere. Solar [illegible] emission on these wavelengths should [illegible] effective temperature of the sun should [illegible] while that of the moon should be ~ [illegible] include the synchrotron emission due [illegible] circulating in solar magnetic fields. [illegible] spectrum of the sun it may be possible [illegible] the effective temperature on wavelengths [illegible] passage of the radiation through the reversing layer [illegible] temperature is apparently lower than that of the photosphere. The apparatus which should be set up on artificial earth [illegible] in order to measure the high-frequency solar and lunar radio emission need not differ to any great extent from ordinary "surface" apparatus. The linear dimensions of the antenna (mirrors) need not be very large since the angular dimensions [illegible] moon and the sun are of the order of 30'. For example, for λ = 0.1 cm the mirror diameter turns out to be about 11 cm.

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Radio-astronomical studies using.... S/560/61/000/007/001/010
E032/E114

The flux of solar and lunar radio emission can only be measured with antennas having high directivity which would require "oriented" satellites. In the case of space rockets launched so that they reach the neighbourhood of Mars, Venus and other planets in the solar system, the radio measurements can be carried out in a wide frequency range. C.H. Mayer, T.P. McCullough and R.M. Sloanaker (Ref.5: Proc. IRE, V.46, 260, 1958) and L.E. Alsop, Y.A. Giordmaine, C.H. Mayer and C.H. Townes (Ref.7: Paris Symposium on Radio Astronomy, Stanford, California, 1959) have already measured the radio emission of Venus and Mars on centimetre waves using a radio telescope with a parabolic mirror 15 m in diameter. On $\lambda = 3.15$ cm the effective temperature of Mars was found to be 220 ± 75 °K, while for Venus the corresponding figure is 600 °K. These measurements represent the present limit of radio astronomical apparatus. On the other hand attempts to extend these measurements to longer decimetre waves, or even metre waves, will meet with serious difficulties. In fact, since the emission of Mars and Venus in this range is of thermal character its intensity should be proportional to λ^{-2}, and hence in order to achieve the same power at the output of the antenna as in the case

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of the shorter wavelengths the area of the antenna must be increased in proportion to λ^2. A mirror having a diameter of about 150 m is already necessary at λ 1 m. In the case of a space rocket, on the other hand, the antenna dimensions can be reduced very considerably, e.g. down to $L \sim \lambda$. The sporadic solar radio emission has been extensively studied in a wide wavelength range beginning at a few cm right up to $\lambda \sim 10$ m. It has been established that the slowly varying (in time) component is associated with sunspots. The other component of the sporadic radio emission takes the form of short bursts. These are due to the radio emission which is largely associated with solar corpuscular streams and also solar cosmic rays emitted from chromospheric flares. The study of the spectral characteristics of these bursts, and also the time dependence of the intensity, is of major importance to any detailed theory of the sporadic radio emission of the sun. The sporadic solar radio emission is also of great interest from the geophysical point of view. The corpuscular streams which are responsible for these bursts are also responsible for geomagnetic disturbances, radio fadeout on short waves, ionospheric disturbances, etc. A consideration of the experimental material available so far shows that in the case of $\lambda \gtrsim 40-50$ m; the study of solar radio bursts can only be carried out with the aid of artificial Earth satellites with orbits lying above the F layer maximum. Satellites will also be used for $\lambda \gtrsim 20$ m. Presently available data (C.W. Allen, Astrophysical Quantities, London, Athlone Press, 1955, Ref.15, and D.E. Blackwell, Monthly Not. Roy. Astr. Soc., V.116, 56, 1956, Ref.16) suggest that the radio bursts on $\lambda \leq 40$ m should be generated at relatively low heights in the corona, namely $R/R_{\odot} \leq 2.1$. On the other hand the regular solar corona is known to extend at least up to $R/R_{\odot} \sim 10-20$ and possibly to even greater distances. It may therefore be expected that the burst component of the sporadic solar radio emission should be observable up to $\lambda \sim 300-400$ m. Thus any information on bursts on wavelength in excess of 20 m would be of considerable interest from the point of view of the physics of the outer solar corona. Satellite apparatus designed to record solar bursts could also be used to detect the bursts due to Jupiter. Particularly interesting information about the latter bursts would correspond to the wavelength range below 20 m. As regards the cosmic radio emission and the radio emission of discrete sources, it is pointed out that presently available data suggest that measurements of the spectrum of the non-thermal cosmic radio emission on $\lambda \gtrsim 30$ m obtained with the aid of artificial earth satellites should lead to more accurate information on the gas concentrations in inter-planetary space for known magnetic fields H. Conversely, these measurements should lead to more accurate values for H if the gas concentration can be determined independently. Accurate satellite measurements of the spectrum of the primary cosmic radio emission should be carried out from high orbits so as to minimise ionospheric effects. Recent rocket and satellite measurements show that the electron concentration above the F-layer decreases with altitude rather slowly (Ya.L. Al'pert, F.F. Dobryakova, E.F. Chudesenko, B.S. Shapiro, UFN, V.65, 161, 1958, Ref.27). It is estimated that in order to minimise ionospheric effects, the measurements of extra-terrestrial radio emission on wavelengths greater than 1 m should be carried out from satellites having an apogee in excess of 1000 km. Inter-planetary absorption of radio waves may become important in satellite measurements. Table 2 gives the estimated absorption in inter-planetary space for 100, 1, and 0.01 electron/

cm^3 where ℓ is the path length in cm. The optical thickness τ given in Table 2 was calculated from a formula given by V.P. Ginzburg (Ref.28: "Propagation of Electromagnetic Waves in Plasma", Fizmatgiz, 1960). This formula reads:

$$\tau = \frac{10^{-2} \cdot N}{Te^{3/2} \cdot f^2} \left[17.7 + \ln \frac{T_e^{3/2}}{f} \right] \cdot \ell \qquad (1)$$

and holds for rarefied plasma for which $(n - 1) \ll 1$. The values given in Table 2 are very approximate but nevertheless it is to be expected that the absorption should become appreciable beginning with $\lambda \sim 500$-1000 m. Another interfering effect in the range $\lambda \gtrsim 200$-300 m may be due to corpuscular streams. A consideration of available satellite and rocket data (Ref.1: as above. Ref.2: F.T. Haddock, Amer. Rocket Soc. No.794, 1959. Ref.3: A.C.B. Lovell, Proc. Roy.Soc. A253, 494, 1959. Ref.4: J.P.I. Tyas, C.A.Franklin, A.R. Molozzi, Nature, 184, 785, 1959) suggest that the satellite antennas should be of a simple form. It is estimated that there should be no intensity difficulties and antenna dimensions of the order of a few metres should be sufficient. As regards the radio emission of discrete sources the wavelength range 20-50 m is of particular interest since it is inaccessible to terrestrial measurements. Here antennas having linear dimensions of the order of the wavelength are estimated to be adequate. In order to achieve angular localization of discrete sources and to determine the details in the distribution of non-thermal cosmic radio emission, one could use the diffraction of extra-terrestrial radio emission by the moon and the earth. Estimates of the radio emission of terrestrial and planetary radiation belts are more difficult. Nevertheless, very rough calculations indicate that the intensities involved should be detectable from artificial earth satellites, and it is precisely because these estimates are difficult that the satellite experiments should be carried out. Finally, satellite and rocket measurements can produce information about the radio emission of the terrestrial and planetary atmospheres and also about the inter-planetary medium. It is suggested that the most promising method of measuring the electron concentration in the ionosphere and in inter-planetary space is the method involving the measurement of the group delay time of audio-frequency modulated signals transmitted from artificial earth

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Radio-astronomical studies using S/560/61/000/007/001/010
E032/E114

satellites (E.Ye. Gershman, N.A. Mityakov and V.O. Rapoport, Ref.37: Izv. vuz, Radiofizika, Vol.3, 949, 1960). It is suggested that a review of available information indicates that the above radio-astronomical observations can be carried out with relatively simple apparatus (this refers to the radio apparatus and the antennas). The authors therefore expect that satellite and rocket radio-astronomical observations will attract considerable attention in the near future.

There are 1 figure, 2 tables and 39 references: 19 Soviet and 20 English. The four most recent English language references read:

Ref.3: as above.

Ref.10: A.R. Tompson, A. Maxwell, Nature, 185, 89, 1960.

Ref.31: J. Van Allen, Nature, 183, 430, 1959.

Ref.39: A.G. Smith, T.D. Carr, H. Bollhagen, N. Chatterton and F. Six. Nature, 187, 568, 1960.

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25943

S/141/61/004/001/003/022
E032/E314

9.9100

AUTHORS: Benediktov, Ye.A. and Mityakov, N.A.

TITLE: On the Absorption of Cosmic Radio Emission in the Ionosphere

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1961, Vol. 4, No. 1, pp. 44 - 48

TEXT: When radio waves are incident normally on the ionosphere, then for frequencies much greater than the critical frequency the absorption of these waves in the ionosphere is given by (Ginzburg - Ref. 5)

$$\Gamma = 4{,}34\,\frac{e^2}{\pi mcf^2}\int_0^\infty N\nu\,dz = 1{,}16\cdot 10^{-2} f^{-2}\int_0^\infty N\nu\,dz \quad (\partial\delta), \qquad (1)$$

where e and m is the charge and mass of the electron,
c is the velocity of light,
f is the frequency,

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S/141/61/004/001/003/022
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N is the electron concentration and
ν is the effective collision frequency..

It is known (Ref. 5) that the effective collision frequency ν is determined by collisions with neutral molecules up to 150 km, while in the F-layer it is determined by collisions with ions. The magnitude of $N\nu$ can be estimated from known values of N and ν in the lower ionosphere (Nicolet - Ref. 6, Kane - Ref. 7 and Nertney - Ref. 8). These data are given in Table 1. Numerical estimates of absorption using Eq. (1) and the data in Table 1 show that the absorption in the lower layers of the ionosphere on 18.6 Mc/s is 0.3 - 0.5 db at midday, which is in agreement with the experimental data reported by Benediktov et al (Ref. 3). In the F-layer, the effective collision frequency is given by (Ref. 5)

$$\nu = \frac{5{,}5N}{T^{3/2}} \ln\left(220\,\frac{T}{N^{1/3}}\right), \qquad (2)$$

where T is the electron temperature. In approximate calculations it may be assumed that $T = 1\,000\ ^\circ K$ and $N = 10^6$ and hence one obtains the approximate expression

$$\nu = \frac{45N}{T^{3/2}} \qquad (2a) .$$

Substituting Eq. (2a) into Eq. (1), we have the following expression for the absorption in the F-layer

$$\Gamma_F = 0.52\, f^{-2} \int \frac{N^2}{T^{3/2}}\, dz \qquad (3) .$$

The electron concentration N is a maximum at 300 km while the temperature in the F-layer increases monotonically with height. Since N^2 changes with height much more rapidly than $T^{-3/2}$, the above expression can be approximated by

$$\Gamma_F \approx 0.52 f^{-2} T_0^{-3/2} \int N^2 dz , \qquad (3a)$$

where $T_0^{-3/2}$ is an average value of $T^{-3/2}$. The electron concentration in the F-layer in the first approximation is given by (Al'pert - Ref. 9)

$$N = \begin{cases} N_0 \left(1 - \frac{z^2}{z_1^2}\right) & (z < 0) \\ N_0 \exp\left(-\frac{z}{z_2}\right) & (z > 0) \end{cases} \qquad (4)$$

where N_o is the electron concentration in the maximum of the layer. It then follows that

$$\int_{-z_1}^{\infty} N^2 dz = \frac{N_0^2}{2}\left(z_2 + \frac{16}{15} z_1\right) \qquad (5)$$

and hence

$$\Gamma_F = 0{,}26 f^{-2} T_0^{-3/2} N_0^2 \left(z_2 + \frac{16}{15} z_1\right). \qquad (6)$$

Assuming standard values for the F-layer ($N_o = 10^6$, $f_c \sim 9$ Mc/s, $z_1 = 150$ km, $z_2 = 300$ km and $T_o = 1\ 000$ °K), we find that at $f = 18.6$ Mc/s, the absorption $\Gamma_F = 1.1$ db. This is also in agreement with experimental data reported in Ref. 3. Thus, the integral absorption of radio waves in the ionosphere on frequencies considerably in excess of the critical frequency is largely determined by absorption in the F-layer. Eq. (6) can also be used to determine the temperature T_o near the maximum of the F-layer. Assuming that $N_o = 1.24 \times 10^{-8} f_c^2$, it is found that

$$\int N dz = 1.24 \times 10^{-8} f_c^2 z_{\text{эфф}} \qquad (7)$$

where the effective thickness of the atmosphere is given by

$$z_{\text{эфф}} = z_2 + \frac{2}{3} z_1 \qquad (8).$$

Using Eqs. (6)-(8), one finds that

$$T_0 = \left(\frac{3{,}1\cdot 10^8}{\int Ndz + 5\cdot 10^{-9} z_1 f_c^2} \frac{f^2}{f_c^2} \Gamma_\rho \right)^{-2/3} \qquad (9)$$

Using the experimental data (Ref. 3) on the absorption in the F-layer on 18.6 Mc/s, one can calculate the product $T_o^{-3/2} z_{эфф}$. In fact, using Eqs. (6)-(8), it turns out that

$$T_0^{-3/2} z_{эфф} \left(1 + 0{,}4 \frac{z_1}{z_{эфф}}\right) = 2{,}5\cdot 10^{14} \frac{f^2}{f_c^2} \Gamma_\rho \qquad (11)$$

Usually, the second factor in the brackets in Eq. (11) can be neglected. Table 2 gives the various parameters for October, 1959, as calculated from the above formulae. It is pointed out that simultaneous measurement of absorption in the F-layer and the total electron concentration $\int Ndz$ can provide reliable information on the temperature near the maximum of the F-layer and its variation with time. Acknowledgments are expressed to V.L. Ginzburg and F.F. Getmantsev for their advice and interest. There are 2 tables and 9 references: 4 Soviet and 5 non-Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of Gor'kiy University)

SUBMITTED: June 6, 1960

27610

3,1700

S/141/61/004/002/002/017
E032/E114

AUTHORS: Benediktov, Ye.A., and Getmantsev, G.G.

TITLE: Sporadic low frequency solar radio emission

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1961, Vol.4, No.2, pp. 244-252

TEXT: Sporadic solar radio emission is said to be clearly defined in the metre range. However, the sporadic radio emission emitted on lower frequencies is also of great interest and has been investigated by a number of authors: (C. Warwick and J.W. Warwick, Paris Symposium on Radio Astronomy, Stanford Univ. Press, 1959, p.203, Ref.1; R. Fleischer Paris Symposium on Radio Astronomy, Stanford Univ. Press, 1959, p.208, Ref.2: H. Daene, Mitt. Astrophys. Observ. Potsdam, 301, 1 (1959), Ref.3: and A. Boischot, R.H. Les, J.W. Warwick, Astroph. J., Vol.131, 61 (1960), Ref.4). The present paper reports some results of observations of solar radio bursts on 25, 18, 13 and 10.5 Mc/s. The observations were carried out during the summer months of 1959 and 1960. The radio bursts were recorded as a side effect with an apparatus designed for the observation of galactic radio

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Sporadic low frequency solar radio... S/141/61/004/002/002/017
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emission below 30 Mc/s. In the case of the 25, 18 and 13 Mc/s observations, the antenna systems consisted of multidipole cophased arrays at a height of $\lambda/4$ above metal ground. The radiation patterns of these antennas were identical and the width of the major lobe at half-power points was 30° x 30°. In the case of the 10.5 Mc/s signals the radiation was detected with the aid of a horizontal rhombic antenna, or by means of a half-wave dipole. Standard receivers with an intermediate frequency bandwidth of 3 kc/s were used. It was found that the number of solar radio bursts was relatively large. More than 60 cases of solar activity at 25 and 18 Mc/s were noted in August 1959. About 40 bursts and groups of bursts on 13 Mc/s were noted in the summer of 1960. Moreover, a number of bursts on 10.5 Mc/s were noted during July/ August 1960. The intensity of the bursts was frequently very high although an absolute estimate of the intensity was only possible in the case of the 10.5 Mc/s observations. Assuming that the effective temperature of the galactic background on this frequency is a few hundred thousand degrees, then the flux density from many of these bursts reached 10^{-19}w m^{-2} cps^{-1}, i.e. the effective

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Sporadic low frequency solar radio... S/141/61/004/002/002/017
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temperature of the sun over the entire disc during these bursts was greater than 10^{11} deg. It was noted that strong low-frequency bursts are relatively rarely accompanied by bursts on higher frequencies. For example, of the 17 bursts noted on 13 Mc/s in August 1960, only 3 were simultaneous with bursts on higher frequencies. The duration of single bursts is not very large (of the order of minutes). Occasionally, series of bursts are observed, as for example on August 30 1959 (Fig.1). In this figure the traces marked a, b and c (a, б and в) correspond to 25, 18 and 10.5 Mc/s (the time is local Moscow time). There is some evidence that solar bursts on even lower frequencies are also present. Since recording of sporadic solar radio emission below 8-10 Mc/s is practically impossible owing to the screening by the ionosphere, observations obtained with the aid of artificial earth satellites are of particular importance. The latter are described by the present authors and V.L. Ginzburg in Ref.7 (Iskusstvennyye sputniki Zemli (to be published)).

There are 5 figures, 4 tables and 7 references: 3 Soviet and 4 non-Soviet. The three English language references are quoted in the text above.

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Sporadic low frequency solar radio S/141/61/004/002/002/017
E032/E114

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Institute of Radiophysics at the Gor'kiy State University)

SUBMITTED: November 24, 1960

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6,9417
3,1720 (1126,1127,1395)

27611
S/141/61/004/002/003/017
E032/E114

AUTHORS: Benediktov, Ye.A., and Eydman, V.Ya.

TITLE: Non-coherent radio emission due to charged particles moving in the earth's magnetic field

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1961, Vol.4, No.2, pp. 253-258

TEXT: The present paper reports an estimate of the intensity of radiation emitted by fast charged particles in the earth's magnetic field on middle and long waves. The emission of electromagnetic waves by an electron moving in a magnetoactive plasma has been discussed in detail by the second of the present authors (Ref.4: V.Ya. Eydman, ZhETF, Vol.34, 131 (1958); Vol.36, 1335 (1959); Dissertatsiya, Gosuniversitet, Gor'kiy, 1960 (Dissertation, Gor'kiy State University)). A quantitative calculation of the intensity of this radiation is extremely difficult, even in the case of a uniformly distributed plasma. In the earth's atmosphere, both the magnetic field and the electron concentration vary with height so that the calculation is even more difficult. In view of this, the intensity can only be
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estimated on the basis of simplifying assumptions. It is well known that the EM waves emitted by an electron moving through a magnetoactive plasma can be divided into two components, namely the synchrotron component and the Cherenkov component. The first of these predominates when $v_{\parallel}/v_{\perp} \ll 1$, $(v_{\perp}/c)n_j(\omega, \theta) \ll 1$, while the second component predominates when $v_{\parallel}/v_{\perp} \gg 1$. $v_{\parallel}$ and $v_{\perp}$ are respectively the parallel and perpendicular velocity components relative to the magnetic field, and n_j is the refractive index of the j-th normal wave. The present authors discuss these two components as follows.

1. Cherenkov radiation. Consider a beam of charged particles, all moving with the same velocity v. Neglecting reabsorption, and assuming that the total intensity is equal to the sum of the individual intensities due to the separate particles, the intensity averaged over a hemisphere is given by

$$J = \frac{1}{2\pi} \int_{z_1}^{z_2} q v_{\parallel} \; w \, dz \qquad (1)$$

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In this expression edge effects are neglected, q is the beam density and w is the intensity emitted by a particle per unit path-length. The integration limits are determined from the condition

$$\cos^2\vartheta \leqslant 1, \qquad (2)$$

where

$$w = \frac{e^2}{2c^2}\int \left| \frac{(\omega^2 - \omega_H^2)(1-\beta^2) + \beta^2\omega_0^2}{\beta^2(\omega_0^2 + \omega_H^2 - \omega^2)} \times \right.$$

$$\left. \times \left\{ 1 \pm \frac{\omega_H\left[(\omega^2-\omega_H^2)(1-\beta^2)^2 + \beta^2(3-\beta^2)\,\omega_0^2\right]}{\left[(\omega^2-\omega_H^2)(1-\beta^2)+\beta^2\omega_0^2\right]\sqrt{(1-\beta^2)^2\omega_H^2 + 4\beta^2(\omega^2-\omega_0^2)}} \right\} \right| \omega d\omega; \qquad (3)$$

and

$$\cos^2\theta = \frac{\left\{2(\omega^2-\omega_0^2)^2\beta^2 - \omega_H^2\left[2\beta^2\omega^2 + (1-\beta^2)\,\omega_0^2\right]\right\}\omega^2}{2\beta^2\left\{(\omega^2-\omega_0^2)^3\beta^2 - \omega_H^2\omega^2\left[\omega^2\beta^2 + (1-\beta^2)\,\omega_0^2\right]\right\}} \pm$$

$$\pm \frac{\sqrt{4(\omega^2-\omega_0^2)\beta^2 + (1-\beta^2)^2\omega_H^2}\;\omega^2}{2\beta^2\left\{(\omega^2-\omega_0^2)^3\beta^2 - \omega_H^2\omega^2\left[\omega^2\beta^2 + (1-\beta^2)\,\omega_0^2\right]\right\}}, \qquad (4)$$

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In these expressions $\omega_H = eH/mc$; $\omega_0 = (4\pi e^2 N/m)^{1/2}$; $\beta = v_{\parallel}/c$; H is the magnetic field; N is the electron concentration; e and m are the electronic charge and mass respectively; and ϑ is the angle between the direction of propagation of the wave and the magnetic field. Eqs. (3) and (4) strictly hold for a uniformly distributed medium only, although they can be used in the case of the earth's ionosphere since ω_0 and ω_H are slowly varying functions of height. The electron concentration, the magnetic field and the refractive index are assumed to vary as indicated in Fig.1 (cf. legend of Fig.1). Eq.(2) imposes an additional limitation on the dimensions of the emitting region. In fact, it follows from Eq.(4) that, independently of the magnitude of ϑ, the following inequality must be satisfied:

$$\omega_H (1 - \beta^2) \geqslant 4\beta^2 (\omega^2 - \omega_0^2) \tag{6}$$

If

$$|\omega^2 - \omega_H^2| \leqslant 3\beta^2\omega_0^2, \quad \omega_H^2 \gg 4\beta^2\omega_0^2 \quad \text{and} \quad \beta^2 \ll 1,$$

then it follows from Eq. (3) that:

$$w \simeq \left| \frac{e^2}{c^2} \frac{\omega^2 - \omega_H^2}{\omega_0^2 + \omega_H^2 - \omega^2} \right| \frac{\omega}{\beta^2} \qquad (7)$$

Substituting into this formula the values of ω_H and ω_0 corresponding to a height of about 1500 km, it is found that

$$J = (5 \times 10^{-20}\ q)\ w\ m^{-2}\ cps^{-1}\ sterad^{-1}.$$

This figure is obtained for the following values of the various parameters involved: $f \sim 0.5$ Mc/s; $\beta^2 = 0.04$ ($E \sim 4.5 \times 10^5$ eV); $\Delta z = 100$ km. When $\beta^2 = 0.01$ ($E = 10^5$ eV) and $\Delta z = 300$ km, it is found that

$$J = (6 \times 10^{-19}\ q)\ w\ m^{-2}\ cps^{-1}\ sterad^{-1}.$$

When the flux density $q = 0.1$ the effective temperature of the radiation corresponding to these intensities is found to be 10^5 °K and 1.2×10^6 °K respectively. For $f \sim 5000$ cps, $\beta^2 \sim 0.01$, $\Delta z = 10^4$ km, $q = 0.1$ electron/cm^3 and $f_0 \sim 1$ Mc/s

($N \sim 100$ electron/cm^3) it is found that the effective temperature is 1.6×10^7 °K.

2. Synchrotron radiation. The frequency of synchrotron radiation due to non-relativistic particles is determined by the magnitude of the magnetic field. To each height of the earth's atmosphere there correspond certain definite generation frequencies given by $\omega = s\omega_H$ where $s = 1, 2, 3, \ldots\ldots$. The intensity of the harmonics decreases with s, beginning with the second harmonic. It follows that in the case of the ionosphere the predominating frequencies will be of the order of 1-2 Mc/s. It is estimated that for heights of the order of 1500 km above the earth's surface, the second harmonic is $\omega \sim 10^7$ ($f \sim 1.5$ Mc/s). Assuming $\omega_0 \cong 10^7$, the intensity of synchrotron radiation on the above frequency is

$$J \sim (10^{-20}\ q)\ \text{w m}^{-2}\ \text{cps}^{-1}\ \text{sterad}^{-1}$$

(ordinary component, $\beta_\perp^2 \sim 0.3$, $\vartheta \sim 10°$). For $z = 3000$ km ($\omega = 8 \times 10^6$), $\omega_0 = 3 \times 10^{11}$, $\beta_\perp^2 \sim 0.3$ and $\vartheta \sim 20°$, it is found that

$$J \sim (10^{-22}\ q)\ \text{w m}^{-2}\ \text{cps}^{-1}\ \text{sterad}^{-1}.$$

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Substituting q = 0.1 as in the case of the Cherenkov radiation, the effective temperature in these two cases is found to be 20 000 °K and 200 °K respectively.
There are 1 figure and 15 references: 11 Soviet and 4 English.
The English language references read as follows:

Ref.1: G.R. Ellis. J. Atm. and Terr. Phys., Vol.10, 302, (1957).
Ref.3: G. Reber. J. Geoph. Res., Vol.63, 109 (1958).
Ref.9: J.A. Van Allen. L.A. Frank. Nature, Vol.183, 430 (1959).
Ref.12: R.B. Dyce. J. Geoph. Res., Vol.64 1163 (1959).

Acknowledgments are expressed to V.L. Ginzburg for discussions.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete
(Scientific Research Institute of Radiophysics at the Gor'kiy University)

SUBMITTED: October 24, 1960

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S/141/61/004/004/021/024
E032/E314

AUTHORS: Benediktov, Ye.A. and Korobkov, Yu.S.

TITLE: Absorption of Cosmic Radio-emission During the Magnetic Storm on April 1, 1960

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1961, Vol. 4, No. 4, pp. 763 - 764

TEXT: The present authors report observations of the intensity of radio-emission on 18.6 and 25 Mc/s. The curves are shown in Fig. 1 (the 25 Mc/s record is displaced in the downward direction relative to the 18.6 Mc/s record). The broken curves show the approximate levels of the undisturbed signal. The top curve shows the variation in the Earth's magnetic field H in the same region. Assuming that the ratio of the absorption coefficient at these two frequencies is

$$\frac{\Gamma_1}{\Gamma_2} = \frac{\omega_2^2 + \nu^2}{\omega_1^2 + \nu^2}$$

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Absorption of Cosmic ....

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(Ref. 3 - V.L. Ginzburg - Plasma-wave Propagation, Fizmatgiz, Moscow, 1961), it is found that Γ_1(18.6 Mc/s)/Γ_2(25 Mc/s) = 1.5 so that $\nu \sim 1.4 \times 10^7$ sec^{-1}. For a normal ionosphere this value of ν corresponds to altitudes of the order of 65 - 70 km. During magnetic disturbances, absorption at such altitudes occurs in the Polar regions. As can be seen from Fig. 1 there is good correlation between the intensity variation and the magnetic-field variation. The correlation is less well defined when the curve obtained in the Leningrad region is used instead of the magnetic field for the Moscow region. Acknowledgments are expressed to G.G. Getmantsev for assistance in this work. There are 1 figure and 6 references: 3 Soviet and 3 non-Soviet. The three English-language references quoted are: Ref. 4 - W.H. Campbell, H. Leinbach - J. Geoph. Res., 66, 25, 1961; Ref. 5 - S. Ziaudin - Canad. J. Phys., 38, 1714, 1960 and Ref. 6 - T. Obayashi, Y. Kahura - J. Radio Res. Lab. Report Ionosph. and Space, Res. Japan, 14, 1, 1960.

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E032/E314

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of Gor'kiy University)

SUBMITTED: March 23, 1961

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9,9130

33200
S/141/61/004/005/002/021
E032/E514

AUTHORS: Artem'yeva, G.M., Benediktov, Ye.A. and Getmantsev, G.G.

TITLE: On the relation between sporadic solar radio emission and the state of the ionosphere

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika v.4, no.5, 1961, 831-848

TEXT: Geophysical phenomena which are associated with chromospheric flares, bursts of radio emission and other manifestations of solar activity may be classified into three groups. The first group contains events which occur practically simultaneously with the onset of a flare or a radio burst. Effects belonging to this group are due to the short wavelength ionizing radiation originating on the sun. An example of this type of phenomenon is the sudden increase in the radiowave absorption in the ionosphere due to ionization by solar UV radiation associated with solar flares. The second group includes phenomena which are delayed relative to the onset of flares and radio bursts and are associated with solar corpuscular streams. Here the delay is of the order of a day as compared with less than 30 min in the case of the firs-

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group. The second group includes magnetic disturbances, auroras and a number of other effects. It has also been established that in addition to the fast (sporadic) variations, the geomagnetic field and the ionospheric parameters are subject to slow changes associated with the general level of solar activity both in the optical and in the radio ranges. This type of slow variation which can be correlated with the level of solar activity belongs to the third group of phenomena. The present authors review the relation between sporadic radio emission of the sun and the state of the ionosphere on the basis of published data and measurements which were carried out at NIRFI during 1958 and 1959. The review is given under the following headings:

1) Relation between solar flares, radio bursts and geophysical phenomena due to the short wavelength ionizing solar radiation.

2) Relation between solar flares, radio bursts and the geophysical phenomena due to corpuscular streams.

3) Long-period variations in the state of the ionosphere and solar radio emission.

It is shown that fade-out and other ionospheric phenomena in the first group are better correlated with bursts of sporadic radio

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emission on high frequencies than with bursts of low frequencies This has been confirmed by the work of M.R.Kundu (Ref 7 J Geophys Res ,65 3903 1960) and also the radio-astronomical and ionospheric observations carried out at NIRFI in 1959 There is considerable evidence suggesting that bursts of solar radio emission on low frequencies are associated with ionospheric and magnetic disturbances due to the entry of solar corpuscular streams into the Earth s atmosphere The use of solar radio emission as an index of solar activity for the purposes of long-range forecasting of the critical frequencies of ionospheric layers does not appear to have any special advantages as compared with the optical index of solar activity A possible advantage is that the solar radio data are frequently easier to obtain than the optical data Acknowledgments are expressed to V V Zheleznyakov who read the manuscript of this paper and made a number of suggestions There are 12 figures and 25 references: 5 Soviet and 20 non-Soviet The English-language references read as follows: Ref 6 O Hachenberg, H Volland,Z Astrophys 47 69, 1959, Ref 7: quoted in text; Ref 18: T Obayashi Y Hakura J Radio Res Lab 7 27 1960, Ref 25. C M Minnis G H Bazzard J Atm Terr Phys 18 297 1960

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APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000200010009-9"

On the relation between sporadic

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ASSOCIATION Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete
(Scientific Research Radiophysics Institute of the Gor'kiy University)

SUBMITTED March 8, 1961

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33216

3,1730 (1126, 1127, 1172)

S/141/61/004/006/001/017
E032/E114

AUTHORS: Belikovich, V.V., Benediktov, Ye.A., and Yerukhimov, L.M.

TITLE: Results of observations of the discrete source Cygnus-A at large zenith angles

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, v.4, no.6, 1961, 993-1003

TEXT: This paper was first read at a conference of MV i SSO SSSR on radioelectronics at Khar'kov in 1960. The authors report results of measurements of the relative intensity of the radio emission due to the Cyg-A source on 29.7 Mc/sec which were carried out at Gor'kiy in 1959-1960. The results correspond to zenith angles of the order of 80°. The interferometer employed had a base length of 20λ, and a beamwidth at half power points was 11° and 13° in the horizontal and vertical planes respectively. Signals from the rhombic antennas were passed through a pre-amplifier and separate mixers with a common heterodyne operating on a frequency of 6.5 Mc/sec. One of the heterodyne channels contained an electronic phase

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reversing switch (operating at 29 cps). The mixers were followed by an i.f. amplifier with a passband of 10 Kc/sec, a square law detector and a heterodyne filter linked with the phase reversing switch. The signals were recorded by a pen recorder with a time constant of 3 sec and a chart speed of 720 mm/r. Fig.3 shows the results obtained during the entire period of observations. Arrows indicate those cases where the radio rise of the source was noted during the observations. The arrows pointing in the downward direction represent radio setting of the source. It is clear from Fig.3 that there is a very considerable spread in the intensity of the source. Analysis of these results has shown that the reduction in the signal level during magnetically quiet days was due to the usual absorption mechanism involving electron-ion and electron-molecule collisions. The reduction in the intensity is well correlated with the degree of magnetic disturbance, particularly at night during winter months. During this period considerable phase distortions were also observed. The variation in the intensity is closely related to the scattering of radio waves by electron density irregularities in the upper layers of the ionosphere. It is suggested that the explanation of the anomalous effects during magnetoactive days should be sought in the interaction between corpuscular streams and the ionosphere near and above the F-layer maximum.

Acknowledgments are expressed to G.G. Getmantsev for interest and assistance.

There are 8 figures, 3 tables and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc. The English language reference reads as follows: Ref.1: H.I.A. Chivers, I.S. Greenhow. J. Atm. Terr. Phys., v.17, 1, 1959.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete
(Scientific Research Radiophysics Institute at Gor'kiy University)

SUBMITTED: March 8, 1961

42157

S/203/62/002/001/005/019
I023/I223

3,1960

AUTHORS: Artem'yeva,G.M., Belikovich,V.V., Benediktov,Ye.A., Yerukhimov,Z.M. and Korobkov,Yu.S.

TITLE: Measurements of cosmic radioemission absorption during the solar eclipse on February 15, 1961

PERIODICAL: Geomagnetizm i Aeronomiya, v.2, no.1, 1962, 58-60

TEXT: During the solar eclipse of February 15, 1961 observations of the cosmic radioemission were made in Yevpatoriya at the following frequencies: 25, 18.6 and 13 Mcs, and in Gor'kiy at 25 and 13 Mcs. Such measurements were omitted during previous eclipses. The purpose of the present measurements is to discover any decrease in the absorption of cosmic radioemission caused by the solar eclipse and to differentiate between the absorption of different layers. The apparatus used in both places was identical. The receiving antennas consisted of six wave ~~vibrators~~. The maximum ~~direction~~ diagram was pointed to the zenith, and the width at half power was 30°. The measurements were conducted for 10-12

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Measurements of cosmic radioemission...

days, before and after the eclipse. Data from the five days, on which f_oF2 was not much different from its value on the eclipse day, were used for further analysis. The variations of the absorption during the eclipse are presented graphically. In Gor'kiy at 25Mcs no effect was observed within experimental errors. The maximum decrease of the absorption is shifted several minutes with respect to the maximum of the eclipse. The lag is near to the value of relaxation time in the D-layer. In Yevpatoriya a second, smaller maximum, lagging by approximately 30 min, was observed. This maximum is probably connected with changes in the absorption in the F-layer, where the relaxation time is much longer than in the D-layer. The ratio of the maximum changes of the absorption in Gor'kiy and in Evpatoriya is approximately equal to the ratio of the Solar zenith angles cosines. The main reason for the changes in the absorption are changes in the electron density in the D-layer. There are 2 figures and 1 table.

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Measurements of cosmic radioemission...

ASSOCIATION: Gor'kovskiy gosudarstvennyy universitet, Radiofizicheskiy institut (Gor'kiy State University, Radiophysical Institute)

SUBMITTED: October 25, 1961

Card 3/3

BENEDIKTOV, Ye.A.; RAPOPORT, V.O.; EYDMAN, V.Ya.

Study of plasma waves in the ionosphere. Geomag. i aer. 2 no.4: 708-711 Jl-Ag '62. (MIRA 15:10)

1. Radiofizicheskiy institut pri Gor'kovskom gosudarstvennom universitete.
(Ionosphere) (Radio waves)

A[illegible]EN'YEVA, O.N.; BELIKOVICH, V.V.; BENEDIKTOV, Ye.A.; YERUKHIMOV, L.M.; ITKINA, M.A.; KOROBKOV, Yu.S.

Results of observations of intensity fluctuations of discrete sources at low frequencies. Geomag. i aer. 3 no.5:835-840 S-O '63. (MIRA 16:11)

1. Radiofizicheskiy institut pri Gor'kovskom gosudarstvennom universitete.

L 5315-66 EWT(d)/FBD/FSS-2/EWT(1)/FS(v)-3/EEC(k)-2/EWA(d) AST/TT/RB/GS/GW/WS-2
ACCESSION NR: AT5023642 UR/0000/65/000/000/0581/0606

106

AUTHORS: Benediktov, Ye. A.; Getmantsev, G. G.; Mityakov, N. A.; Rapoport, V. O.; Sazonov, Yu. A.; Tarasov, A. F.

85

TITLE: Results of the intensity measurements of radio-frequency radiation at frequencies of 725 and 1525 kc by means of the apparatus installed in the satellite Elektron-2

B+1

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 581-606

TOPIC TAGS: artificial earth satellite, radio emission, ionosphere, atmospheric radiation, radio receiver, geomagnetic field

ABSTRACT: The results of radio-frequency measurements taken by the Elektron-2 satellite are analyzed and the equipment used is described. Two fixed-frequency receivers tuned to 725 and 1525 kc were used with a common dipole antenna. One side of the antenna was a 3.75-m metal stub, and the other side was the body of the satellite; the radiation resistance was 0.033 ohm for 725 kc and 0.146 ohm for 1525 kc for a capacitance of 46 pF. The receivers used straight amplification with 3 rf

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